THE LIFESCIENCES MAGAZINE

★★★ The Most
PROMISING GENE
SILENCING *STARTUPS*
to Watch in 2024

PRAMOMOLECULAR GmbH

MERLE FUCHS
CEO AND CO-FOUNDER

MARKET RESEARCH REPORT
Navigating The Future Of Cardiology

GLOBAL EVENTS
Global Events in Gene Therapy & Gene Silencing

Shaping the Healthcare of Tomorrow with
New Drugs Against
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FROM EDITOR'S DESK

In the ever-evolving landscape of lifesciences, innovation is the cornerstone of progress, paving the way for groundbreaking discoveries and transformative technologies. In this month's issue of The Lifesciences Magazine, we are thrilled to shine the spotlight on **"The Most Promising Gene Silencing Startups to Watch in 2024,"** featuring **PRAMOMOLECULAR GmbH** gracing our cover.

As pioneers in the field of gene silencing, PRAMOMOLECULAR GmbH exemplifies the spirit of innovation and entrepreneurship driving advancements in lifesciences. With a focus on harnessing the power of RNA interference (RNAi) technology, PRAMOMOLECULAR GmbH is at the forefront of developing novel therapies for a myriad of diseases, ranging from genetic disorders to cancer.

Through their cutting-edge research and groundbreaking initiatives, PRAMOMOLECULAR GmbH is revolutionizing the landscape of gene silencing, offering new hope for patients and clinicians alike. Their dedication to scientific excellence, coupled with a commitment to addressing unmet medical needs, positions them as a leader in the burgeoning field of RNAi therapeutics.

In this issue, we delve into the innovative approaches and transformative potential of PRAMOMOLECULAR GmbH, showcasing their visionary leadership, groundbreaking research, and promising pipeline of therapeutic candidates. As we embark on a new era of lifesciences innovation, PRAMOMOLECULAR GmbH stands as a beacon of progress, inspiring the next generation of gene silencing startups and shaping the future of healthcare.

Join us as we celebrate the ingenuity and impact of PRAMOMOLECULAR GmbH and explore the dynamic landscape of gene silencing startups poised to make waves in 2024 and beyond.

Shalmali

Shalmali W.

REDEFINING THE SCIENCE OF LIFE

The Lifesciences Magazine is global healthcare solutions platform that paves the way for various healthcare innovations, advices of professionals.

THE LIFESCIENCES MAGAZINE

LEADERS IN SPOTLIGHT

For the cover read about -

Addressing diseases rooted in overactive or mutated proteins has become a pressing need. These aberrant proteins play a pivotal role in various serious conditions, posing challenges to effective treatment. Recognizing this, developing targeted and efficient therapeutic interventions has become more crucial than ever. In scenarios as such, a focused approach towards silencing or regulating these problematic proteins can offer a promising avenue for tackling diseases at their core, ushering in a new era of precision medicine and improved patient outcomes.

With that being said, **PRAMOMOLECULAR GmbH** is focused on developing innovative drug candidates to address serious diseases. Co-founded by **Merle Fuchs** and her partners, the company's primary approach involves silencing disease-causing proteins in critical organs like the lungs, heart, and pancreas. Advanced technology, particularly "self-delivering siRNAs," aims to create potent solutions for aggressive diseases, with a specific emphasis on lung and pancreatic cancer.

Effective delivery is currently constrained to the liver, creating a significant medical demand for transfecting cells in other organs. Recognizing this challenge, Merle and her cofounders Ida Shaef and Thomas Hiller seized the opportunity to repurpose a technology initially designed
for transfecting cells with mononucleotides.

Leveraging this innovative approach, they successfully adapted the technology for the transfection of small oligonucleotides, addressing a critical need in the medical field of small therapeutic oligonucleotides

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PRAMOMOLECULAR GmbH

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MERLE FUCHS
CEO and co-founder

PRAMOMOLECULAR GmbH

COVER STORY

Shaping the Healthcare of Tomorrow with New Drugs Against 'Undruggable Diseases'

Addressing diseases rooted in overactive or mutated proteins has become a pressing need. These aberrant proteins play a pivotal role in various serious conditions, posing challenges to effective treatment. Recognizing this, developing targeted and efficient therapeutic interventions has become more crucial than ever. In scenarios as such, a focused approach towards silencing or regulating these problematic proteins can offer a promising avenue for tackling diseases at their core, ushering in a new era of precision medicine and improved patient outcomes.

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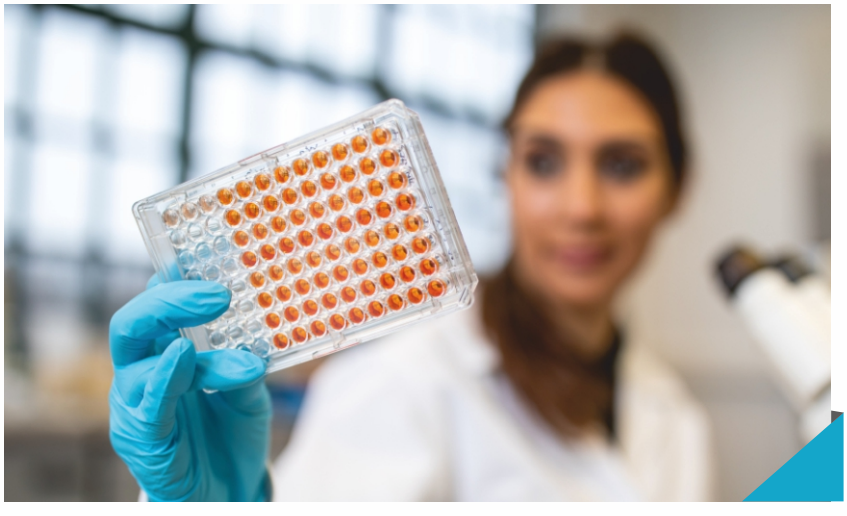
Effective delivery is currently constrained to the liver, creating a significant medical demand for transfecting cells in other organs. Recognizing this challenge, Merle and her cofounders Ida Shaef and Thomas Hiller seized the opportunity to repurpose a technology initially designed for transfecting cells with mononucleotides. Leveraging this innovative approach, they successfully adapted the technology for the transfection of small oligonucleotides, addressing a critical need in the medical field of small therapeutic oligonucleotides.This strategic move positioned the company at the forefront of advancing therapeutic solutions, bridging the gap in effective delivery methods for medical treatments. As the Chief Executive Officer, Merle is focused on propelling the company to greater heights and fulfilling its mission while catering to several leadership roles and responsibilities.



Remarkable Entrepreneurial Leadership Background

With a distinguished career path marked by academic achievements and entrepreneurial leadership, Merle's professional journey began with a focus on biology, pursuing studies in Germany, the Netherlands, and the USA.

During her interdisciplinary doctorate in the laboratory of Nobel Prize winner Manfred Eigen at the Max Planck Institute for Multidisciplinary Sciences in Göttingen (Germany), she also expanded her skills in the laboratory of Richard Lerner at the Scripps Research Institute in La Jolla (CA). Since 2000, she has served as an independent management consultant with her company TechnologieContor. Her impactful focus on business development and financing has been particularly instrumental for technology leaders. Her influence extended further as a consultant for high-tech startups and growing companies, impacting over 500 innovative companies. She co-founded eight high-tech startups, highlighting her commitment to fostering innovation and technological advancement. As a co-founder, Merle was involved in a venture dedicated to producing therapeutic oligonucleotides. Acknowledging the challenges of delivering these molecules, she particularly emphasizes the difficulty of introducing therapeutic oligonucleotides into their target cells, a prevalent hurdle in medical practices.

Boasting nearly 25 years dedicated to technology transfer, Merle's expertise has fostered innovation. Essentially, Merle's entrepreneurial journey unfolded with a focus on the evolutionary design of new proteins, which led her to establish her own company in 2021. Beyond her roles in these startups, she extends her influence to governance, serving on supervisory boards, advisory boards, and advisory committees of federal and state ministries, networks, scientific institutions, and companies. Merle's multifaceted career reflects her commitment to driving science, technology, and business advancements. With PRAMOMOLECULAR, Merle and the team seek to solve the problem of diseases caused by overactive or mutated proteins by developing targeted and effective therapeutic interventions.

Cutting-Edge Platform Technology

PRAMOMOLECULAR is helping shape the future of healthcare by developing new drugs against “undruggable diseases”. The company is at the forefront of developing a cutting-edge platform technology designed to effectively transfect lung, heart, pancreas, and colon cells in vivo with small therapeutic oligonucleotides like ASOs, siRNAs, or miRNAs. The company is actively developing self-delivering therapeutic oligonucleotides to address organs besides the liver.

PRAMOMOLECULAR has a platform technology protected by international patent applications. The innovative start-up uses it to develop its own active ingredients . In addition it offers innovative delivery molecules to other developers of therapeutic oligonucleotides for the codevelopment of promising drug candidates.

Specializing in innovative gene silencing therapies, PRAMOMOLECULAR focuses on addressing diseases currently deemed “incurable.” Leveraging covalently linked, lipid-based delivery molecules, the company facilitates the transportation of nucleic acid-based drugs into lung, heart, and pancreatic cells in vivo. The groundbreaking “self-delivering siRNAs" represent a highly innovative class of drugs, allowing efficient down-regulation of disease-causing proteins, including mutated or overexpressed proteins.

PRAMOMOLECULAR aims to deliver well-tolerated and effective therapeutics for patients facing serious diseases. Their initial drug candidates target conditions such as non-small cell lung cancer (NSCLC), pancreatic ductal adenocarcinoma (PDAC), gastric cancer (GC) and heart failure.

In addition to advancing its proprietary drug candidates, PRAMOMOLECULAR actively seeks collaborations, expressing interest in co-developing and licensing its delivery technology to other developers of nucleic acid-based drugs for specific applications. This strategic approach underscores the company’s commitment to driving innovation and making impactful contributions to gene silencing therapies.

Wide Array of Responsibilities

Merle entered the industry with a mission - to tackle challenges that remained unresolved by others. Her commitment to finding innovative solutions led her to PRAMOMOLECULAR, where she faced the formidable task of securing funding in a challenging financial landscape. The impact of the COVID-19 pandemic exacerbated the difficulties, as the promised funding for PRAMOMOLECULAR was diverted to Covid research. At the same time, there has been a global slump in biotechnology financing since 2021, the year PRAMOMOLECULAR was founded. However, the company secured funding from business angels and subsidies, is located in the BioCampus Berlin-Buch in a cost-effective location with an outstanding technological environment in the field of siRNA development, is organized in a highly virtual manner, which allows for low fixed costs and a high degree of flexibility and professionalism, and uses the combination of artificial intelligence and rational design of RNA drugs, which enables particularly rapid and cost-effective development of drug candidates up to clinical phase II.

Currently, Merle leads the team of PRAMOMOLECULAR efficiently and strategically. Her robust background in molecular biology, coupled with a keen entrepreneurial spirit, has significantly contributed to the continuous success of the startup. Being at the helm, she takes charge of comprehensive responsibilities spanning information gathering, strategic and financial planning, business development, and communication. Merle excels in acquiring strategic cooperation partners, a skill crucial for the growth

and success of the company. Additionally, she is pivotal in securing financing for the company's ventures. With a multifaceted approach to leadership, Merle Fuchs combines her scientific expertise with entrepreneurial acumen, driving the company towards innovative and successful endeavors. As a dynamic leader, Merle's leadership is characterized by her efficient leadership style marked by quick decision-making, consistent actions, a strong sense of responsibility, and a keen willingness to take on challenges. Her collaborative spirit is evident in her strong willingness to cooperate with others. Merle holds a doctorate in evolutionary biotechnology, where she recognizes the paramount importance of diversity, selection pressure, information transfer, and self-organization in evolution. Despite being a compact team of six, PRAMOMOLECULAR boasts diverse backgrounds, training, interests, and experiences, fostering collaboration with exceptional network partners. Acknowledging the significant selection pressure in developing effective and safe medicines amidst financial constraints, the team gathers thorough information from diverse sources, encompassing literature, professional exchange, and intensive reflection. This information is openly shared both internally and externally. The success of their endeavors hinges on the self-organization and high motivation of every team member, creating a dynamic and collaborative work environment at the young biopharma company.

Unique Approach to Leveraging Technology

PRAMOMOLECULAR utilizes the potential of the outstanding technology of RNA interference (RNAi). The Nobel Prize for Medicine and Physiology was awarded in 2006 for the discovery of this gene silencing by siRNAs. When these siRNAs enter a cell, they can specifically down-regulate disease-causing proteins: No disease-causing protein - no disease! Collaborating with other companies and research groups, the company designs siRNAs covalently linked to lipid-based delivery molecules. Once these engineered siRNAs bind to mRNA in the cell, the cell perceives a viral attack and cleaves the mRNA, disrupting the blueprint of the disease-causing protein. This disruption results in the elimination of the disease-causing protein, addressing the root of the problem.

However, siRNAs and other therapeutic oligonucleotides, such as miRNAs, shRNAs or antisense oligonucleotides, face challenges due to their larger size than conventional drug molecules. Being approximately 70 times larger than aspirin, these molecules are highly loaded and prone to instability. They undergo degradation by the liver, excretion by the kidneys, enzymatic destruction in the blood, and encounter difficulties in crossing cellular membranes. To facilitate the cellular entry of these molecules, delivery technologies are essential. Currently, existing delivery technologies primarily function effectively in the liver. This limitation is evident in the fact that the five approved siRNA drugs exclusively

target disease-causing proteins in the liver. Recognizing the medical need, PRAMOMOLECULAR aims to extend the application of this technology to downregulate disease-causing proteins in other organs, presenting an exciting prospect for future developments.

At PRAMOMOLECULAR, the company possesses a proprietary platform technology featuring two different covalent lipid-based delivery molecules. These lipids are directly coupled through a defined chemical linker to therapeutic oligonucleotides such as siRNAs or antisense DNAs. Notably, this delivery approach doesn't require nanoparticulate formulations, relying solely on these lipid-based delivery molecules.

A Broad Spectrum of Possibilities

PRAMOMOLECULAR can theoretically downregulate every disease-causing protein in its target organs. While the company acknowledges the broad spectrum of possibilities, it strategically addresses oncogenic proteins associated with lung, pancreatic, and gastric cancer. In particular, the company directs attention to undruggable KRAS mutations. KRAS, a pivotal protein in cell metabolism, undergoes alterations in certain mutations, rendering it resistant to downregulation. This persistent activity in cellular metabolism increases the risk of cancer development.

By downregulating specific oncogenic proteins, the company aims to halt tumor growth, a concept validated by experiments on animals. Despite the promising potential, the difficulty in effectively delivering siRNA drugs to cells, such as those in the colon, pancreas, or the lungs, has hindered progress in treating specific cancers, like gastric cancer, lung cancer or pancreatic cancer with these mutations. Primarily, PRAMOMOLECULAR also focuses on proteins that play a role in heart disease. It has thus extended its efforts to a broader spectrum of medical challenges, particularly in the field of metabolic diseases.

Acknowledging and Transcending Beyond Uncertainties

Merle emphasizes that institutions and individuals should invest a lot of energy, talent and money in biotechnology - not only to be prepared for the next health crisis, but also to solve production, food, raw material and energy problems in an environmentally friendly and efficient way - in order to create new technological foundations and application-oriented technologies. Hence, in biopharma entrepreneurship, she dedicates her energy to building and advancing PRAMOMOLECULAR, maintaining a focused perspective amid the dynamic landscape of oncology. As a biopharma entrepreneur, she dedicates her energy to building and developing the startup while maintaining a focussed perspective in the dynamic landscape of drug development. Despite the remarkable advances in cancer treatment - from vaccines and antibody therapies to CAR-T cell therapy - Merle insists that the diverse arsenal to combat highly aggressive cancer cells is still needed to keep pace with the broad spectrum of different cancers and especially with the high mutation rate of cancer cells.

In view of the increasing developments in the field of gene silencing technologies, Merle sees both increased competition and greater opportunities to improve drug candidates. And in view of the major advances in biotechnology - also in other areas such as nutrition, industrial processes or renewable raw materials - she emphasises the assessment that we are living in the century of biotechnology.

Within the growing gene silencing industry, Alnylam has so far been THE outstanding symbol of the technology's potential. All five active ingredients that are currently on the market were developed by Alnylam and all address serious diseases with a high medical need. But there are even more inspiring success stories: DTx Pharma, a Californian biotech startup, was acquired by Novartis last summer for the impressive sum of $1 billion while still in the preclinical phase. Similar to PRAMOMOLECULAR, DTx Pharma had a proprietary platform technology that utilized covalent, lipid-based delivery molecules for siRNAs, albeit with different tissue preferences.

A Vivid Analysis of the Latest Transformative Impacts

With continued technological advances and innovations in healthcare, Merle sees a transformative impact of gene silencing in cancer treatment. She believes this approach holds promise for precisely treating different cancer mutations. The specificity of gene silencing allows for the targeted treatment of different mutations in the company's intended organs. Merle emphasizes that siRNAs are particularly safe and well tolerated, unlike traditional chemotherapeutics. The company can efficiently create a drug pipeline tailored to combat different mutations by using the appropriate siRNA for each mutation and the optimal carrier molecule for each organ. While Merle recognises that no therapeutic approach, including gene silencing, can be a panacea for all cancers, she expects significant progress, especially in combination with other innovative treatment methods.

While the healthcare industry is undergoing a promising transformation with remarkable advances in diagnostics and therapy, Merle recognises the challenges posed by increasing cost pressures on healthcare systems. Recognising the inevitable costs, Merle and PRAMOMOLECULAR are working hard to provide efficient and well-tolerated solutions to patients struggling with currently untreatable serious diseases. In navigating the complexities of the biopharmaceutical landscape, Merle remains determined and draws inspiration from industry leaders and innovative start-ups. Under her leadership, PRAMOMOLECULAR strives to contribute to the century of biotechnology with a vision based on delivering impactful solutions to patients facing major health challenges. To tomorrow's leaders seeking a job in the healthcare industry, Merle advises: "Be well prepared and work hard!"

COVER STORY

ICYHOT PRO
PAIN RELIEF CREAM
Pain relief isn't just for pros

s.

GENE SILENCING:

Entering A World With Less Suffering

Picture this: the genetic code, resembling an ancient manuscript, intricately written with the instructions of life. Now, imagine a regulatory mechanism, similar to a molecular maestro, selectively muting certain sections of this script. This symphony of silence, arranged within our cells, holds profound implications for understanding and harnessing the power encoded in our genes. Gene silencing — a captivating narrative entangled into our very existence, leading us to unravel the mysteries hidden within us. This is how I would start if I was to write a book where the villain uses some advanced procedures to mix DNA and create a new creature to horror the world with its wicked abilities. However, in this article, you will know all there is to learn about gene silencing.

What is Gene Silencing?

Gene silencing is a cutting-edge treatment approach that harnesses the body's natural mechanisms to combat diseases by temporarily blocking specific genes linked to certain health conditions. This "silencing" involves inhibiting a gene's message, preventing undesired effects. Various gene silencing methods exist, with Silence Therapeutics emphasizing RNA interference, an inherent biological process regulating gene activity and defending against viruses. This rapidly evolving field holds promise for precise, lifelong treatments tailored to specific genetic diseases, with approvals already granted for certain conditions.

NOTE: GENE SILENCING

Think of your genes as a recipe book for your body. Gene silencing is like putting a sticky note on specific recipes to skip them for a while, ensuring the kitchen (your body) stays in perfect order. It's like a chef's secret to maintaining harmony in the cooking process.

NOTE: NEED OF GENE SILENCING

Imagine you're making cookies, and you accidentally put too much sugar. Gene silencing is like a magical ingredient that helps you control the sugar, fixing genetic mistakes in your body so everything works just right!

What is the need for gene silencing?

Our body's instruction manual, the DNA, sometimes has errors or mutations during cell production. These mistakes can result in the production of too many or faulty proteins, leading to genetic diseases like cystic fibrosis, Huntington's disease, and certain cancers. Conventional treatments may struggle with these conditions. However, gene silencing steps in as a promising approach. It's like fixing a glitch in the body's system, temporarily quieting specific genes causing trouble. This tailored intervention offers hope for treating diseases rooted in our genes more effectively.

Gene silencing acts as a kind of genetic trouble-shooter, addressing issues at their source and potentially providing relief for conditions that have been challenging to manage. With this approach, scientists aim to fine-tune our genetic instructions, opening up new possibilities for treating a range of genetic diseases in a more precise and personalized way. It helps in targeted treatment, genetic disorders, reducing unwanted gene expression, chronic diseases, and many more.

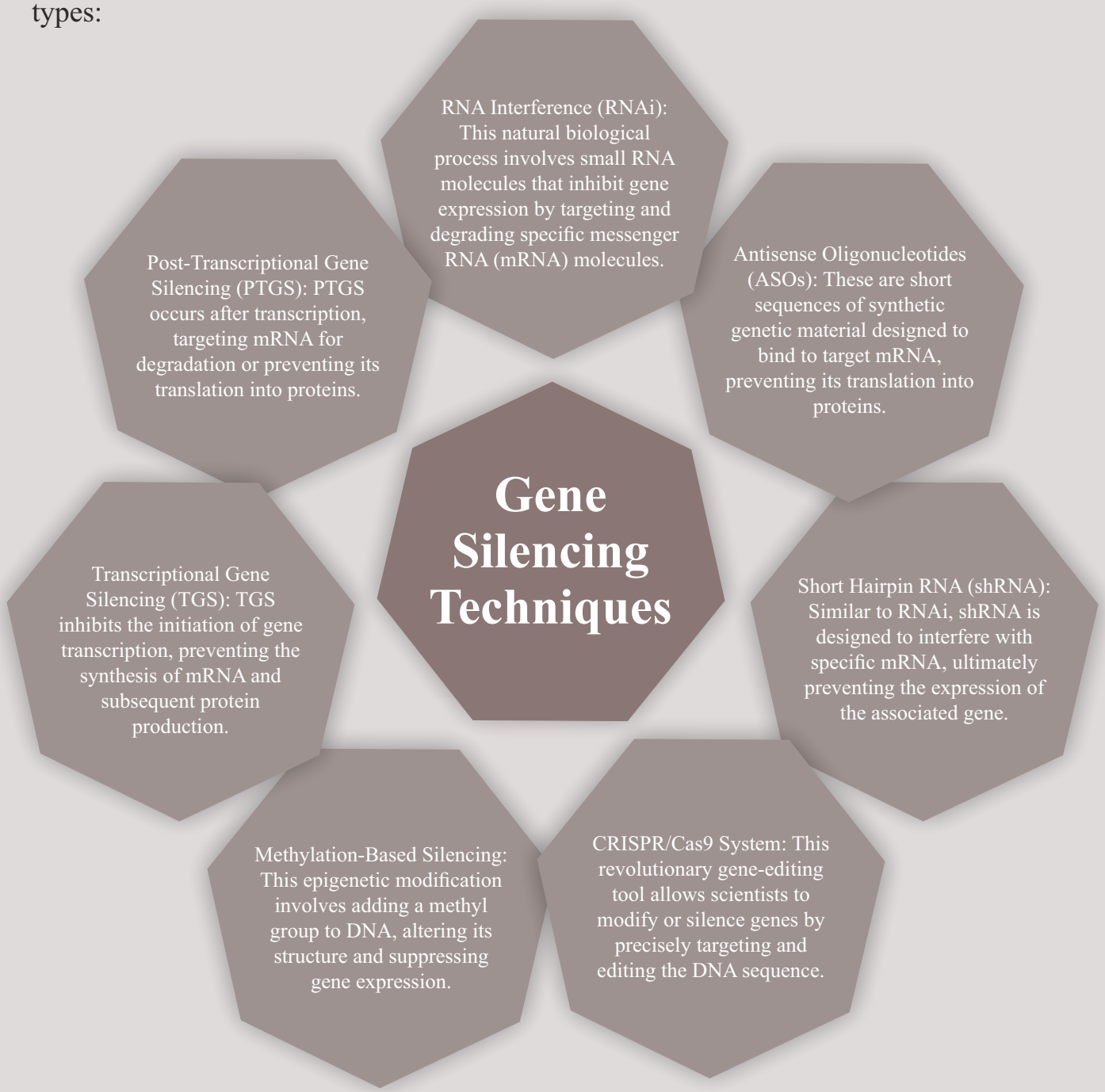
Difference between Gene Silencing and Gene Therapy:

Many people get confused between gene silencing and gene therapy and the difference between these two.

Gene Silencing	Vs	Gene Therapy
Suppress or 'silence' specific genes associated with diseases.	**Objective**	Introduce, modify, or replace genes to treat or prevent diseases.
Inhibit the expression of target genes to prevent unwanted effects.	**Method**	Add, edit, or replace genes within the patient's cells.
RNA Interference (RNAi), Antisense Oligonucleotides (ASOs), CRISPR/Cas9 (in some cases)	**Approaches**	Viral vectors or gene editing tools like CRISPR/Cas9.
Inhibit the expression of target genes to prevent unwanted effects.	**Purpose**	Correct or replace faulty genes to treat genetic disorders.
Temporary or long-term suppression of targeted gene expression.	**Outcome**	Permanent or long-term modification of the patient's genetic makeup.

Different Techniques To Achieve Gene Silencing:

There are several types of gene silencing techniques, each with its unique approach to controlling the activity of specific genes. Here are some common types:



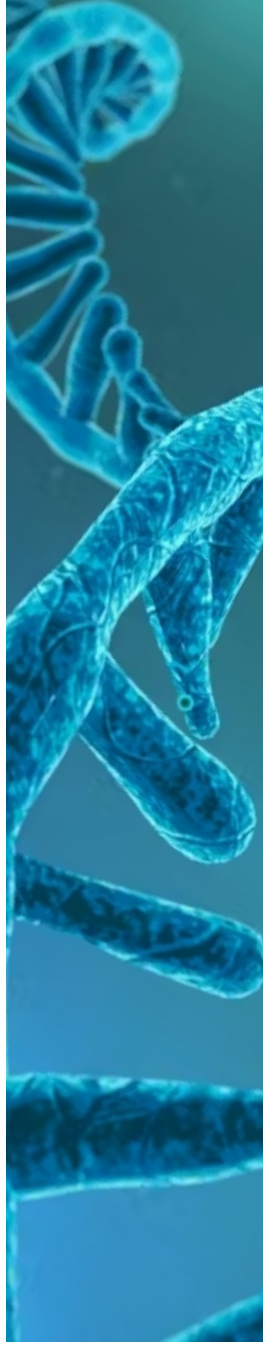
Each type of gene silencing has its advantages and applications, providing researchers and clinicians with diverse tools to address specific genetic conditions.

Conclusion

Gene silencing holds incredible potential for improving human health by helping us tackle diseases at their root – the genes. By selectively quieting problematic genes, we can potentially treat genetic conditions more effectively and with fewer side effects. This field of research opens up new possibilities for personalized medicine, offering hope for better and more targeted treatments. Unlike the villain from my book it is destined to change the future of healthcare, even achieve a future of no sickness and no suffering.

NOTE: GENE SILENCING VS GENE THERAPY

Okay, imagine your recipe for cookies is like the instructions for making you. Gene silencing is when you use a special trick to tone down or quiet a particular ingredient (gene) that might make your cookies taste a little funny. Gene therapy, on the other hand, is like adding a new and improved ingredient to make your cookies even better or fixing an ingredient that's not quite right.



When antihistamines fail, the itch prevails.
Ditch THE Itch
zoetis

GLOBAL EVENTS IN GENE THERAPY & GENE SILENCING

1. ISCT 2024 – International Society of Cell & Gene Therapy

The Global Society of Cell and Gene Therapy Annual Meeting is an important global summit for professionals involved in the cell and gene therapy translation sector. The event focuses on setting aims, policies, solutions, and a consensus path forward for the sector over each successive year. It addresses key challenges and bottlenecks in the development of cell and gene therapies. The meeting serves as a platform for professionals to connect, educate, inspire, network, and collaborate in the field of cell and gene therapy translation.

Location: *Vancouver, Canada*

Dates: *29th May to 1st June 2024*

Source: ISCT 2024 – International Society of Cell & Gene Therapy

2. CGTP Summit 2024

The CGTP Summit is an event that emerged in 2023 as an extension of the Cell and Gene Therapy Products Symposium. It brings together professionals from the industry, regulatory bodies, and academia, totaling over 300 attendees. The summit is designed to discuss significant challenges in the field of cell and gene therapy. The one-day program includes speaker presentations and interactive panel discussions, and the event is available for both in-person attendance and virtual participation through live streaming.

Dates: *10th June 2024*

Location: *Bethesda North Marriott Hotel & Conference Center, Rockville, MD, United States*

Source: https://www.casss.org/cgtp-summit

3. The Cell & Gene Meeting on the Mesa

The Cell & Gene Meeting on the Mesa is a top annual conference where industry leaders and decision-makers in cell and gene therapy come together to advance cutting-edge research. The event focuses on overcoming commercialization challenges in the sector, covering topics like clinical trial design, payment models, and logistical aspects. With expert-led panels, extensive partnering opportunities, and presentations by leading companies, the conference aims to facilitate collaborations and highlight progress in both clinical and commercial aspects of cell and gene therapy.

Dates: *7thOctober 2024 to 9th October 2024*

Location: *Arizona Biltmore, Phoenix, AZ*

Source: https://meetingonthemesa.com/

4. GENAP Summit 2024 (Gene & Cell Therapy | Aseptic Processing Summit)

The GENAP Summit is an event that brings together industry leaders from pharmaceutical and biotechnology companies to explore cutting-edge advancements in cell and gene therapies along with aseptic processing technologies. The summit covers various aspects of gene and cell therapy development, including breakthroughs in vector improvement, CMC strategy, analytical development, and product quality. Additionally, it addresses non-viral gene therapies, bioassays, stability, and formulation. Simultaneously, the Aseptic Processing Technology (APT) track provides insights into regulatory updates, implementation strategies, and best practices for safe and efficient aseptic production, covering topics such as environmental monitoring systems, facility cleaning, and disinfectant qualification. The event aims to facilitate knowledge exchange, collaboration, and innovation in these intersecting fields.

Dates: *22nd Feb 2024 to 23rd Feb 2024*

Location: *Geneva, Switzerland*

Source: https://genapsummit.com/

5. Cell & Gene Therapy Research & Development Congress: Asia

This event provides a comprehensive view of gene therapy development, covering discovery, clinical trials, manufacturing, and commercialization in five tracks. Interactive sessions address key challenges, and industry experts share real-world case studies on regulatory submissions and clinical trial operations. Attendees can find practical solutions to hurdles in gene therapy development, engage with vendor companies, and gain valuable insights from the entire gene therapy journey.

Date: *17th Apr 2024 to 18th Apr 2024*

Location: *Singapore*

Source: https://global-engage.com/product/cell-gene-therapy-2024/#price-section

6. Gene Therapy Development 2024

This event provides a comprehensive view of gene therapy development, covering discovery, clinical trials, manufacturing, and commercialization in five tracks. Interactive sessions address key challenges, and industry experts share real-world case studies on regulatory submissions and clinical trial operations. Attendees can find practical solutions to hurdles in gene therapy development, engage with vendor companies, and gain valuable insights from the entire gene therapy journey.

Dates: *13th June 2024 to 14th June 2024*

Location: *London, UK*

Source:
https://oxfordglobal.com/cell/events/gene-therapy-development-2024

7. Cell & Gene Therapy Virtual Event Series 2024

The inaugural 2024 Cell & Gene Therapy Event is focused on discussing the latest medical advancements in genetics and cellular techniques. The event will cover topics such as cutting-edge therapies like CAR-T cell therapy, CRISPR gene editing, clinical trial updates, and regulatory considerations. Additionally, it aims to comprehensively explore disease applications, spanning from cancer to genetic disorders, while addressing ethical and societal impacts related to cell and gene therapy.

Date: *16th OCT 2024*

Time: *6:00 AM PDT*

Source: https://www.labroots.com/virtual-event/cell-gene-therapy-2024

8. The Global Cell & Gene Therapy Summit

The International Conference on Cell and Gene Therapy focuses on the rapidly expanding fields of biomedical research, particularly in cell and gene therapy. These therapies aim to treat, prevent, or cure diseases, ranging from rare and complex conditions to those with genetic or acquired origins. The event serves as a platform for experts from academia and industry to discuss various aspects of cell and gene therapy, including ethical considerations, social implications, tools, techniques, marketing strategies, and the commercialization of these transformative therapies. Additionally, the conference showcases the latest research progress in cell and gene therapy, aiming to foster collaboration, knowledge exchange, and advancements in the availability and productivity of these therapies for the benefit of patients worldwide.

Dates: *8th July 2024 to 10th July 2024*

Venue: *Boston Marriott Newton – Hotel*

Source: https://unitedscientificgroup.com/conferences/gene-therapy/

9. 7th Annual Gene Therapy for Rare Disorders Summit

The 7th Gene Therapy for Rare Disorders Summit is an event focused on addressing the challenges and advancements in the field of gene therapy. Specifically, it aims to tackle significant clinical, manufacturing, regulatory, and commercial challenges faced by gene therapy programs. The summit brings together key figures from various sectors, including industry, regulatory bodies, patient non-profits, payers, and service providers. The goal is to facilitate collaboration and collective progress in advancing rare gene therapy programs into and through the clinical stages. Attendees can expect to gain essential insights, form connections with industry peers, and address specific bottlenecks in the development and progression of gene therapies for rare disorders.

Dates: *26th March 2024 to 29th March 2024*

Location: *Boston, MA*

Source: https://genetherapy-conference.com/

10. International Human Gene Therapy Conference

The conference, Gene Forum 2024, is focused on advancing the field of gene therapy. It serves as an international summit held in Berlin, Germany, providing a platform for collaboration and knowledge exchange among researchers, industry leaders, and collaborators. The conference aims to explore and discuss the latest advancements, trends, and breakthroughs in gene therapy, a field at the forefront of medical innovation. Participants can expect sessions covering various aspects of gene therapy, fostering meaningful interactions, and facilitating collaborations. The overarching goal is to contribute to the ongoing progress in addressing genetic disorders and advancing personalized medicine.

Dates: *1st July 2024 to 3rd July 2024*

Location: *Berlin, Germany*

Source: https://genetherapyconference.com/

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Cardiovascular diseases are increasing day by day due to our lifestyle these days. Each one of us needs a small to medium-timed workout regime to sweat it out. Sweating due to physical exertion is a win-win situation and good for the heart. It keeps the functioning smoother and efficient. Our genes have authority over every component of the cardiovascular system. It monitors the strength of the blood vessels and also supervises how the cells in the heart communicate with each other. A genetic variation in a single gene can make an impact on the possibility of developing a heart disease.

If a family member is diagnosed with any cardiac ailment, the rest of the family is also recommended to be tested for any heart-related issues. As the genes pass on these conditions from one generation to another, it is better to be tested and safe. If found in any family member, early treatment is the best cure for cardiac ailments. The early-stage diagnoses save lives, hence screening is vital for the whole family to be doubly sure.

The types of inherited cardiovascular disease are as follows:

- **Cardiomyopathy**
- **Heart arrhythmias**
- **Cardiac tumors**
- **Heart valve disease**
- **High cholesterol**
- **Pulmonary hypertension**
- **Autoimmune disease**

Exploring Cutting-Edge Gene-Silencing Approaches in Cardiovascular Disease

Role of Gene Silencing:

Gene silencing is a relatively new treatment technique for cardiovascular diseases. It uses your body's natural processes to control the disease by suppressing or silencing specific genes that are associated with certain diseases. It means blocking a message from a gene that will cause an unwanted effect on the person's heart, and cause cardiac issues. The blockage is temporary to not allow the trigger of the gene's message. It is a fast-moving area of research. It has the potential to provide highly targeted treatments for specific heritable diseases as a potential lifelong treatment and has already been approved for some conditions.

1. Mechanism of RNAi and Antisense:

The expression of genes can be affected by siRNA capturing and finally cleaving complementary mRNA. RNAi is a multipart road that can be divided into two different phases: the initiation phase and the effector phase. SiRNA duplexes regulatory molecules with about 21-23 nt are processed in the initiation step by cutting long dsRNA by RNase III which is called Dicer. The cut part of it contains a 5'-phosphate and a 3'-hydroxy group as well as 2 nt 3'-overhangs.

2. Stabilization of siRNA and its delivery agents:

To overcome the deterioration of free and naked siRNA in vivo and in vitro there is the need for stabilizing the nucleic acid. The endo and exonucleases which are present in blood, serum, and alive cells minimize the half-lived. Many efforts have taken place in the chemical sector in the last 10 years to conserve the siRNA from nuclease degradation. Maintaining gene-silencing activity is an important issue when modifying synthetic siRNA. The use of peptide transduction is another way to improve the durability and transfection rate. Eguchi et al. revealed in their research that cationic PTDs neutralize the negative charge of nucleic acids by specific binding on the backbone of dsRNA.

3. Liposomes and lipids:

The charge of liposomes plays an important role in tissue distribution. Neutral liposomes are preferred for in vivo transfection and are often used in tumor biology. Therefore, siRNA is incorporated into neutral 1,2-dioleoyl-sn-glycero-3- phosphatidylcholine (DOPC) liposomes and used efficiently in silencing genes involved in the cancer-causing agents. These results were acknowledged by the study about liposome-incorporated protease-activated receptors.

4. Autoimmune disease

Discovery of RNAi:

The complete plant genome sequences have brought new dimensions in genetic modification to improve plant features. Scientists believed that they could produce any gene products by just introducing imported genes into plants, which was not always the case. Plant biologists found out that bringing in multiple copies of a gene that codes for purple petunia flowers led, not as expected to a deeper purple hue. Via an unknown mechanism, the introduced transgenes were silenced as well as the plant's purple-flower gene. In another research, gene silencing was also observed when plants were infected with RNA viruses engineered to contain fragments of the plant gene.

In addition to its roles in regulating gene expression, RNAi is used as an immune response to infection and as a natural defense mechanism against molecular parasites such as jumping genes and viral genetic elements that affect genome stability.

How does RNAi work?

1. The entry of long double-stranded RNA, such as an introduced transgene, a rogue genetic element, or a viral intruder, triggers the RNAi pathways of cells. This results in the recruitment of the enzyme Dicer.
2. Dicer splits the dsRNA into short, 20-25 base pairs long, fragments called small interfering RNA (siRNA).
3. An RNA-induced silencing complex (RISC) distinguishes between the two siRNA strands as either sense or antisense. The sense strands are degraded.
4. The antisense strands on the other hand are incorporated into the RISC. These are used as guides to target messenger RNAs in a sequence-specific manner.
5. Messenger RNAs which codes for amino acids, are cleaved by RISC. The activated RISC can repeatedly participate in mRNA degradation, inhibiting protein synthesis.

Gene Silencing Therapeutics in Cardiology:

Oligonucleotide therapeutics, with ASOs and siRNAs representing the most prominent gene-silencing technologies, have emerged as a new generation of precision medicines for an increasing number of diseases with high unmet medical needs, including cardiovascular diseases. However, unmodified oligonucleotides lack drug-like properties, and decades were spent optimizing their chemistry and developing advanced drug delivery systems that were required for these molecules to become drugs.

These therapeutics are rapidly degraded and eliminated without the chemical modifications that assure stability and mediate delivery to the intended tissue. Ubiquitous nucleases hydrolyze the bond between phosphodiester groups in DNA/RNA and the sugar moiety of each base, thus degrading nucleic acids. A phosphorothioate modification safeguards the phosphodiester bond in ASOs and siRNAs against enzymatic hydrolysis and improves the delivery of ASOs by increasing hydrophobicity and improving protein binding. Formation of ASO-protein complexes increases the ASO half-life in circulation and reduces urinary excretion to facilitate distribution to the liver, spleen, and kidney.

Applications of gene silencing:

Gene silencing can occur through various mechanisms, including epigenetic modifications, RNA Interference (RNAi), and Antisense Oligonucleotides (ASOs). Epigenetic modifications, such as DNA methylation and histone modification, can affect the accessibility of the DNA to transcription factors, thereby silencing gene expression.

Here are some applications of gene silencing:

Gene silencing has potential applications in various fields, including medicine, biotechnology, and agriculture. In medicine, gene silencing can be used to treat diseases caused by the over-expression of a particular gene, such as cancer and genetic disorders. By silencing these genes, the growth of cancer cells can be inhibited, which leads to the lapse of tumors.

In biotechnology, it can be used to improve the production of proteins in recombinant protein expression systems. By silencing genes that interfere with the production of a particular protein, the yield of the protein can be increased.

In the agriculture field, gene silencing can be used to better the quality of crop yield. Eg. RNAi-based technologies are being developed to silence genes that are responsible for the production of toxins in crops, such as maize and cassava. By silencing these genes, the crops can become more resistant to bugs and pathogens, leading to higher yields and better quality.

Conclusion:

Gene silencing is important in many aspects and improves the quality of elements wherein it is used. The mechanism of gene silencing can occur through various mechanisms, including epigenetic modifications, RNAi, and ASOs. Significant progress has been made in developing RNAi-based therapies and Antisense Oligonucleotides (ASOs) for the treatment of diseases caused by the over-participation of a particular gene. It is also being explored as a tool for improving the production of proteins in recombinant protein expression systems.

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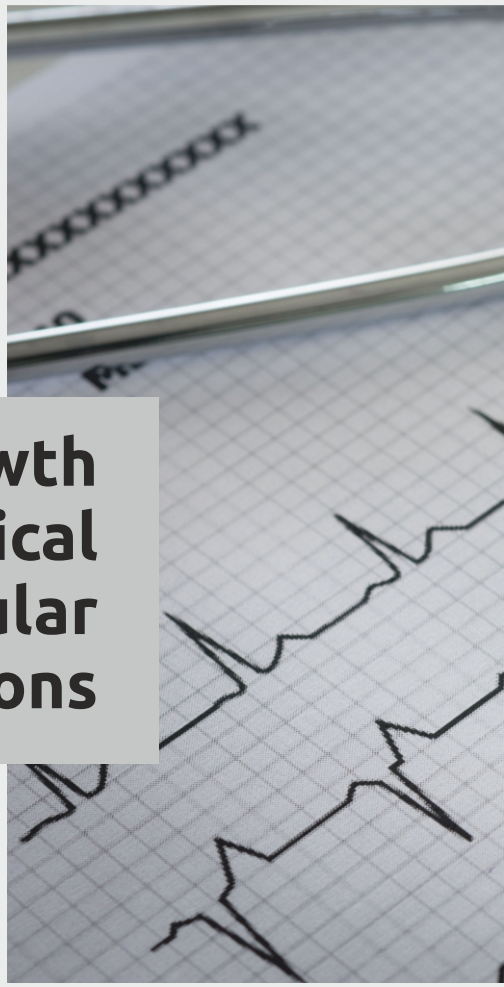
NAVIGATING THE FUTURE OF CARDIOLOGY:



Global Trends and Growth Prospects in Medical Devices for Cardiovascular Applications

The global medical devices in the cardiology market is substantial and continues to grow. Factors such as an aging population, increasing prevalence of cardiovascular diseases, and technological advancements contribute to the market's expansion. Cardiovascular diseases (CVDs) remain a leading cause of morbidity and mortality globally.

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- Market Introduction
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- Global Medical Devices In Cardiology Market, By Therapeutic And Surgical Devices
- Global Medical Devices In Cardiology Market, By Region
- Competitive Landscape
- Company Profiles

Global Medical Devices in Cardiology Market: Covid-19 Impact

Many elective cardiac procedures, such as elective surgeries and non-urgent diagnostic tests, were postponed or canceled to prioritize resources for COVID-19 patients. This led to a temporary decline in certain cardiology-related medical device procedures.

Patients with chronic conditions, including cardiovascular diseases, faced challenges in accessing routine healthcare services due to lockdowns, fear of exposure, and overwhelmed healthcare systems. This had implications for the monitoring and management of cardiovascular health. The pandemic accelerated the adoption of telemedicine and remote patient monitoring, including for cardiac patients. Wearable devices and remote monitoring solutions gained prominence for managing chronic conditions and ensuring continuity of care.

Disruptions in the global supply chain affected the availability of medical devices, including those used in cardiology. The pandemic highlighted vulnerabilities in the supply chain and prompted discussions on building more resilient healthcare supply networks.

Global Medical Devices in Cardiology Market: Key market players

- Medtronic
- Abbott Laboratories
- Boston Scientific
- Edwards Lifesciences
- St. Jude Medical
- Biotronik
- Getinge
- Terumo
- W. L. Gore & Associates
- Lepu Medical Technology

Global Medical Devices in Cardiology Market:

Growth Drivers

Rising Incidence of Cardiovascular Diseases
Aging Population
Technological Advancements

Restraining Factors

High Costs of Advanced Devices
Regulatory Challenges
Data Security and Privacy Concerns

Opportunity Factors

Technological Innovations
Digital Health Integration
Personalized Medicine

Global Medical Devices in Cardiology Market: Regional Insights

The U.S. is a major market for cardiology devices, driven by advanced healthcare infrastructure, a high prevalence of cardiovascular diseases, and significant investments in research and development. The regulatory environment, including FDA oversight, influences product approvals and market access.

European countries, with established healthcare systems, are key players in the cardiology devices market. The presence of regulatory bodies like the EMA and diverse healthcare policies across EU member states can impact market dynamics. Countries like Germany, the UK, and France are major contributors.

As a rapidly growing market, China has seen increased demand for cardiology devices due to lifestyle changes and a rising aging population. The regulatory landscape is evolving, and companies are adapting to market conditions.

FAQ's

- **What are the key factors driving the Medical Devices in Cardiology Market?**

The rising incidence of chronic cardiovascular illnesses worldwide is a major factor driving the global market for cardiovascular devices. Cardiovascular illnesses are the world's biggest cause of mortality, according to the World Health Organization.

- **Which region will contribute ably towards the Medical Devices in Cardiology Market?**

The North America region has captured largest of the revenue share in 2023.

- **What are the key players in Medical Devices in Cardiology Market?**

B Braun Melsungen AG, Medtronic, Abbott, Johnson & Johnson Services, Inc. and others are the key players in Medical Devices in Cardiology Market

YOUNG, *wild*, AND FREE
IS EXACTLY HOW YOU FEEL WHEN THE
handsome stranger
OFFERED HIS SHOULDERS AT THE
LOCAL ROCK CONCERT.
PERHAPS A LITTLE TOO
wild & free.
YOU CAN ONLY TUG DOWN
YOUR *short shorts* AND HOPE
THEY'LL SOAK UP THE PERSPIRATION.
WAIT! HERE'S YOUR SONG!
Raise your hands IN THE AIR LIKE
YOU JUST DON'T CARE!
oh no
ALL YOU CAN DO IS HOLD ON BEFORE YOU
SLIP OFF *his shoulders.*

Lume Whole Body Deodorant

RNA Interference vs. CRISPR-Cas9: A Battle for Gene Silencing Supremacy

In the grand arena of cellular life, a silent war wages for control of the genetic orchestra. On one side, the nimble RNAi, a molecule smaller than a whisper, wields its double-stranded scissor blades. On the other, the mighty CRISPR-Cas9, a protein complex resembling a molecular samurai, brandishes its precise targeting expertise. Both seek the same crown: the power of gene silencing, the ability to mute specific genetic notes and rewrite the symphony of cellular function.

The Stealthy Ninja: RNA Interference (RNAi)

RNAi, the "stealthy ninja" of gene silencing, has been lurking in the shadows of cells for millennia. Discovered in the 90s, it leverages a naturally occurring mechanism used by plants and worms to defend against viruses and mobile genetic elements. Imagine a tiny double-stranded RNA molecule as the assassin. It infiltrates the cellular machinery, seeks out its target mRNA (messenger RNA), the blueprint for protein production, and recruits a protein complex called RISC (RNA-induced silencing complex) to deliver the silencing blow. RISC cleaves the mRNA, preventing its translation into protein, effectively putting the gene on mute.

RNAi's Advantages:

Specificity: RNAi can target specific genes with high precision, minimizing unintended effects.

Variety: Different types of RNAi molecules allow for targeting diverse types of genes.

Natural process: Utilizing an existing cellular mechanism reduces potential safety concerns.

RNAi's Disadvantages:

Transient silencing: The effects of RNAi are temporary, requiring repeated administration for long-term effects.

Delivery challenges: Delivering RNAi molecules into cells can be difficult, particularly in vivo.

Off-target effects: Although rare, RNAi can sometimes silence unintended genes due to sequence similarities.

The Mighty Samurai: CRISPR-Cas9

CRISPR-Cas9, the "mighty samurai" of gene silencing, arrived on the scene more recently, in 2012. Unlike RNAi, which targets mRNA, CRISPR-Cas9 directly alters the DNA itself. Imagine CRISPR-Cas9 as a programmable molecular scalpel. Guided by a carefully designed RNA molecule, it locates the target DNA sequence and precisely snips it, causing a double-strand break. The cell's natural repair mechanisms then patch up the break, sometimes introducing errors that can permanently disable the gene.

CRISPR-Cas9's Advantages:

Permanence: CRISPR-Cas9 edits the DNA itself, leading to potentially permanent gene silencing.

Versatility: It can be used to not only silence genes but also insert, edit, or replace DNA sequences.

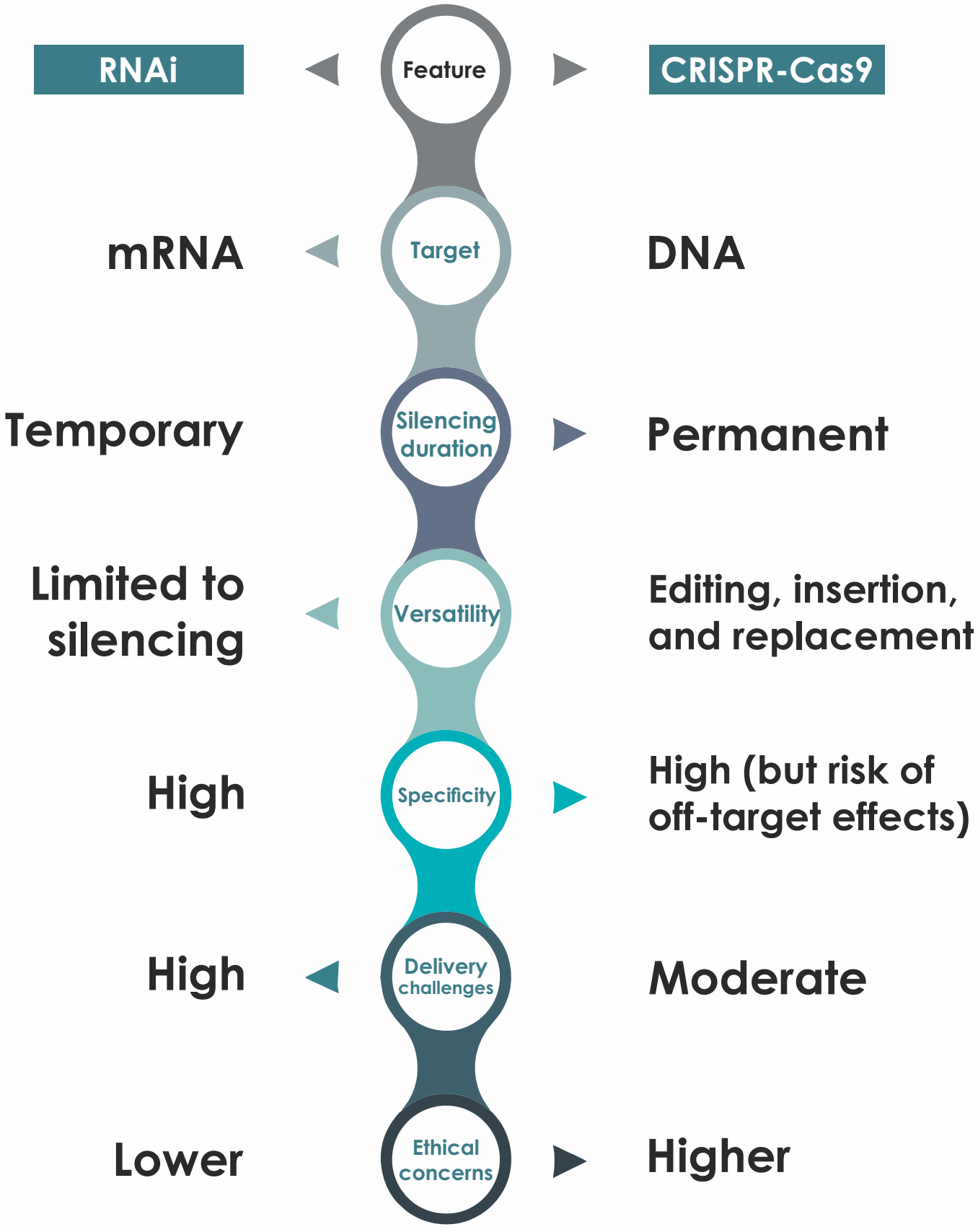
Ease of targeting: The guide RNA can be easily designed to target specific DNA sequences.

CRISPR-Cas9's Disadvantages:

Off-target effects: Targeting errors can lead to unintended DNA edits and potential harm.

Ethical considerations: Gene editing raises ethical concerns regarding potential misuse and unintended consequences.

Technical challenges: Delivery and efficient editing in specific tissues remain technical hurdles.


RNAi
Feature
CRISPR-Cas9
mRNA
Target
DNA
Temporary
Silencing duration
Permanent
Limited to silencing
Versatility
Editing, insertion, and replacement
High
Specificity
High (but risk of off-target effects)
High
Delivery challenges
Moderate
Lower
Ethical concerns
Higher

The Future of Gene Silencing: Collaboration or Competition?

The battle for gene silencing supremacy is far from over. Both RNAi and CRISPR-Cas9 offer unique advantages and challenges, making them suitable for different applications. In the future, we may see these technologies not as rivals but as collaborators, each playing a critical role in the symphony of gene editing and therapeutic development. RNAi's precision and natural origin may be ideal for short-term silencing in specific tissues, while CRISPR-Cas9's versatility and permanence could revolutionize gene therapy and genetic disease treatment.

Real-World Applications

Silencing Cancer's Song: RNAi is being tested to silence genes promoting tumor growth in cancers like prostate and ovarian. In contrast, CRISPR-Cas9 edits cancer-causing mutations or removes entire cancer-related genes, holding promise for personalized treatments.

Quieting Neurodegeneration's Din: Silencing the huntingtin gene with RNAi shows promise in slowing the progression of Huntington's disease. CRISPR-Cas9 edits gene mutations linked to Alzheimer's and Parkinson's, offering hope for future therapies.

Combating Viral Whispers: RNAi can target viral mRNA, hindering replication and offering potential in viral disease treatment. CRISPR-Cas9 edits viral genomes, disabling their ability to infect and spread, offering a powerful weapon against future pandemics.

Boosting the Regenerative Chorus: Researchers use RNAi to silence genes that inhibit tissue repair, promoting regeneration in injuries and potentially reversing aging. CRISPR-Cas9 edits genes to trigger stem cell differentiation, potentially regenerating lost organs or tissues.

This brief dive into real-world applications showcases the diverse potential of RNAi and CRISPR-Cas9, from silencing disease-causing genes to boosting regenerative processes. With further research and refinement, these tools hold immense promise for revolutionizing medicine and shaping our future health.

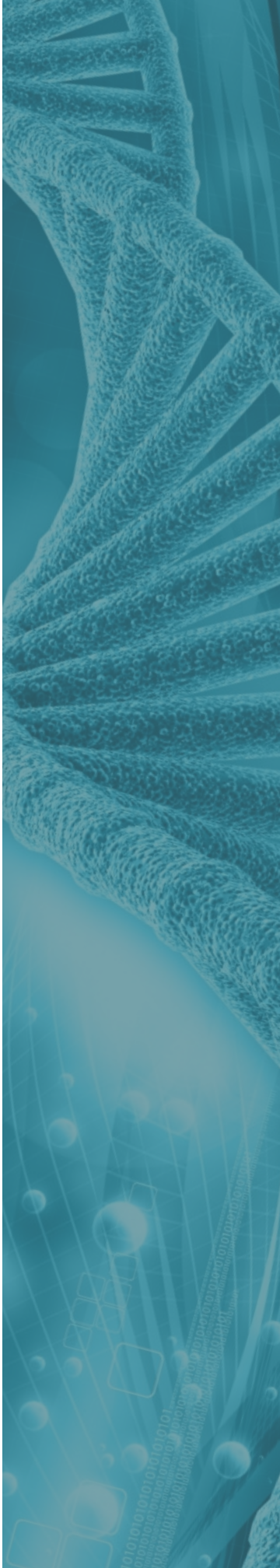
Challenges

The battle against off-target effects in both RNAi and CRISPR-Cas9 is a top priority. Researchers are developing more precise targeting methods, like modifying guide RNAs or harnessing natural targeting mechanisms. Delivery hurdles are also being tackled, with advancements in viral vectors and nanoparticle carriers increasing cellular uptake. Additionally, researchers are exploring ways to mitigate potential ethical concerns through open dialogue, public engagement, and robust regulatory frameworks. These ongoing efforts aim to refine these powerful tools while ensuring their responsible and safe use for the benefit of all.

The challenges continue beyond off-target effects and delivery. For RNAi, transient silencing necessitates repeated administration, prompting research into longer-lasting options like RNAi-inducible plasmids. CRISPR-Cas9 faces its own hurdles with potential unintended edits and mosaicism (incomplete editing). Here, advances in base editing tools capable of fine-tuning specific DNA bases offer more nuanced control. Both technologies grapple with editing efficiency, especially in specific tissues. Researchers are exploring innovative delivery methods like ultrasound cavitation and electroporation to overcome these barriers. Ultimately, by refining tools, mitigating unintended consequences, and fostering ethical awareness, we can unlock the full potential of these gene-silencing marvels for a healthier future.

The Ethical Symphony: Responsible Tuning of the Genome

While the melodies of gene editing promise disease cures and enhanced living, their powerful notes necessitate cautious orchestration. The ethical considerations surrounding these technologies resonate deeply:



Concept	Potential Issues	Considerations
Germline Editing	Altering future generations	Ban on human germline editing
Designer Babies	Choosing traits like eye color	Prohibiting eugenics, ensuring equality
Unforeseen Consequences	Unintended mutations	Thorough testing, risk assessment
Access and Equity	Costly therapy	Affordable access, preventing genetic discrimination

These are just a few instruments in the ethical orchestra. Responsible use requires continuous dialogues between scientists, policymakers, and the public to ensure we amplify the benefits while minimizing the dissonances.

By playing our respective parts in this ethical symphony, we can ensure that the powerful tools of gene editing resonate with a melody of progress, benefiting all without compromising our shared humanity.

By understanding the strengths and weaknesses of both RNAi and CRISPR-Cas9, we can appreciate the remarkable potential of gene silencing technologies for advancing medical research, developing novel therapies, and ultimately rewriting the human genetic story.

No harsh toothpaste.

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NEWS OF THE WEE

DNA LOOPS:

The Silent Guardians of Gene Activity

The Twist of Silence: Our DNA isn't just a linear code, it folds and loops to control gene activity. A new USC study unravels how these loops act as silencers, keeping key developmental genes in check.

Unmasking the Guardians:

PRC1 & PRC2: These molecular guardians lock developmental genes away, preventing their inappropriate activation.

The Looping Act: Repressed genes form loops, bringing them closer for PRC1 and PRC2 to bind.

Breaking the Silence: Without loops, these genes escape their silence, potentially leading to developmental issues or even cancer.

EK

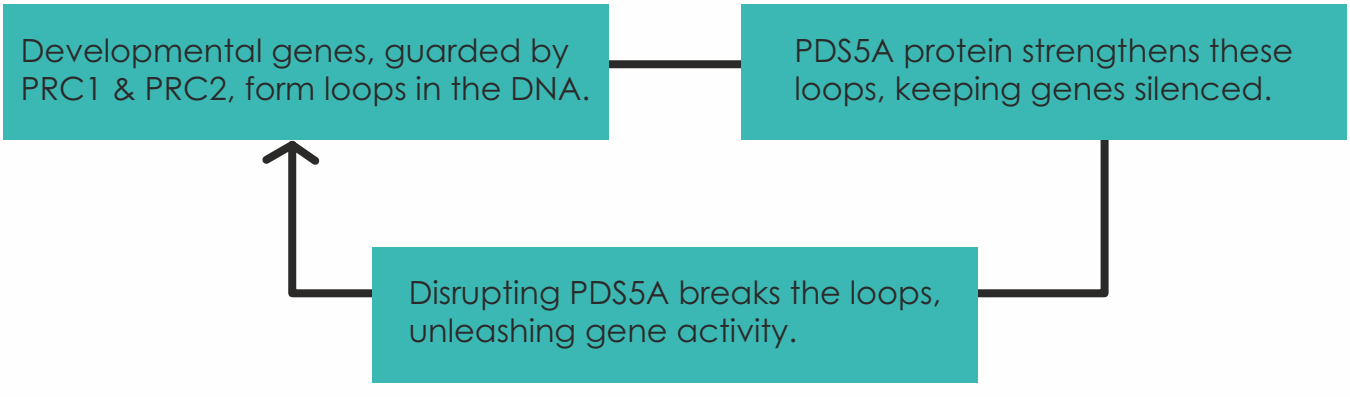
KEY FINDINGS:

- A protein called PDS5A maintains these loops, crucial for gene silencing.
- Disrupting PDS5A unlocks silenced genes, revealing their dependence on loop formation.
- This discovery sheds light on how cohesin mutations linked to diseases might affect gene silencing.

IMPACT:

- Understanding gene silencing opens doors for potential therapies targeting diseases linked to disrupted gene control.
- This research lays the groundwork for future studies on cohesinopathies and their impact on gene regulation.

The Looping Dance Of Gene Silencing:



Breaking Discovery: Silencing Genes Overcomes Chemoresistance in Head and Neck Cancer

In a groundbreaking study led by Queen Mary University of London, researchers have identified two genes responsible for chemoresistance in head and neck cancer. The findings, published in Molecular Cancer, reveal that silencing these genes can make cancer cells responsive to chemotherapy.

Key Findings:

Identified Genes: NEK2 and INHBA were identified as two genes causing chemoresistance in head and neck squamous cell carcinoma (HNSCC).

Broad Applicability: These genes are found to be active in most human cancer types, suggesting potential applicability to other cancers exhibiting elevated levels of these genes.

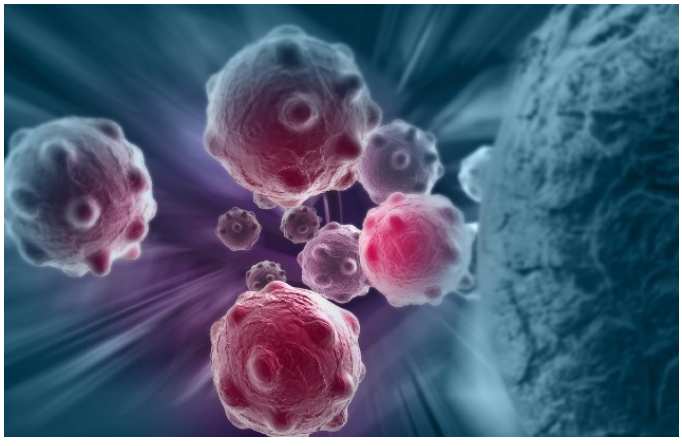
Chemical Library Exploration: Researchers explored a chemical library for drug discovery and found two substances – Sirodesmin A (a fungal toxin) and Carfilzomib (from a bacterium) – that target the identified genes, making resistant cancer cells significantly more sensitive to cisplatin, a common chemotherapy drug.

Drug Repurposing: The study indicates the potential for repurposing existing drugs, like Sirodesmin A and Carfilzomib, to target chemoresistance genes, offering a cost-effective approach compared to developing new drugs.

Clinical Implications:

Personalized Treatment: The research suggests a promising step towards personalized cancer treatment based on individual genes and tumor types, leading to better survival rates and treatment outcomes.

Addressing Chemoresistance: Overcoming chemoresistance in head and neck cancer could potentially improve treatment efficacy and patient outcomes.



Cost-Efficiency: Repurposing existing drugs may offer a cost-effective solution for developing targeted therapies against chemoresistance.

Significance:

Prevalence of HNSCC: Head and neck squamous cell carcinoma accounts for 90% of all head and neck cancers, with tobacco and alcohol use being major risk factors.

Survival Rates: The overall 5-year survival rate for patients with advanced HNSCC is less than 25%, highlighting the need for breakthroughs in treatment strategies.

Current Challenges: Standardized treatments for HNSCC patients, irrespective of genetic makeup, contribute to treatment failures and poor survival rates.

The study's senior author, Dr. Muy-Teck Teh, emphasizes the potential of targeting specific genes to combat chemoresistance, offering hope for improved cancer treatment outcomes.

Drug Delivery Breakthrough:

Berkeley Lab & Genentech Team Up on LNPs

Problem: Drugs often struggle to reach their target cells in the body, limiting their effectiveness.

Solution: Lipid nanoparticles (LNPs) - tiny fatty pouches that carry drugs to cells.

The Research:

Berkeley Lab & Genentech collaborate to design better LNPs.

High-throughput workflow rapidly creates & analyzes hundreds of LNP formulations.

Small-angle X-ray scattering (SAXS) reveals LNP structure & stability.

LNP structure linked to drug activity in cells (ASO silencing faulty gene).

Benefits:

Improved drug delivery for vaccines, gene therapy, and more.

Faster development of new & effective treatments.

Broader application of LNP technology beyond mRNA vaccines.

KEY TAKEAWAYS:

- **LNPs are promising drug delivery vehicles with vast potential.**
- **High-throughput research accelerates LNP development and optimization.**
- **Understanding LNP structure & activity paves the way for better drugs.**

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